

USPN: 10/689,942

Atty. Docket No.: 2002B159/2

Reply to Office Action of December 20, 2006

Amendment dated March 9, 2007

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CLAIMS:

LISTING OF CLAIMS:

1. (Previously Amended) A composition comprising:

- (a) an elastomer comprising C₄ to C₇ isooolefin derived units;
- (b) a processing oil;
- (c) a material selected from:
 - (i) a hydrocarbon resin grafted with a graft monomer;
 - (ii) oligomers having units selected from the group consisting of cyclopentadiene, substituted cyclopentadiene, C₅ monomers, and C₉ monomers, wherein the oligomers are grafted with a graft monomer, or
 - (iii) combinations of (i) and (ii)

2. (Original) The composition according to claim 1 wherein the hydrocarbon resin is selected from the group consisting of: aliphatic hydrocarbon resins, hydrogenated aliphatic hydrocarbon resins, aromatic hydrocarbon resins, hydrogenated aromatic resins, aliphatic/aromatic hydrocarbon resins, hydrogenated aliphatic/aromatic hydrocarbon resins, cycloaliphatic hydrocarbon resins, hydrogenated cycloaliphatic resins, cycloaliphatic/aromatic hydrocarbon resins, hydrogenated cycloaliphatic/aromatic hydrocarbon resins, polyterpene resins, terpene-phenol resins, rosin esters and mixtures of two or more thereof.

3. (Original) The composition according to claim 1 comprising 2-10 phr grafted material.

4. (Original) The composition according to claim 1 comprising 4-8 phr grafted material.

5. (Original) The composition according to claim 1 wherein hydrocarbon resin is a thermally polymerized aromatic-containing cyclopentadiene hydrocarbon resin.

6. (Original) The composition according to claim 1 wherein the hydrocarbon resin is substantially hydrogenated before grafting.

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7. (Original) The composition according to claim 1 wherein the oligomers are oligomers comprising cyclopentadiene, substituted cyclopentadiene, and C₉ monomers.
8. (Original) The composition according to claim 1 wherein the oligomers are substantially hydrogenated before grafting.
9. (Original) The composition according to claim 1 wherein the grafted material has an aromatics content less than 15%.
10. (Original) The composition according to claim 1 wherein the processing oil is selected from paraffinic oils, aromatic oils, naphthenic oils, and polybutene processing oils.
11. (Original) The composition according to claim 1 comprising 2-20 phr processing oil.
12. (Original) The composition according to claim 1 comprising 5-15 phr processing oil.
13. (Original) The composition according to claim 1 wherein the graft monomer is maleic anhydride.
14. (Original) The composition according to claim 1 further comprising a filler selected from carbon black, modified carbon black, silicates, exfoliated clay, partially exfoliated clay, modified exfoliated clay, modified partially exfoliated clay, and mixtures thereof.
15. (Original) The composition according to claim 1 further comprising a secondary rubber selected from natural rubbers, polyisoprene rubber, styrene-butadiene rubber (SBR), polybutadiene rubber, isoprene-butadiene rubber (IBR), styrene-isoprene-butadiene rubber (SIBR), ethylene-propylene rubber, ethylene-propylene-diene rubber (EPDM), polysulfide, nitrile rubber, propylene oxide polymers, poly(isobutylene-co-p-methylstyrene), halogenated poly(isobutylene-co-p-methylstyrene), poly(isobutylene-co-cyclopentadiene), halogenated poly(isobutylene-co-cyclopentadiene), poly(isobutylene-co-isoprene-co-p-methylstyrene), halogenated poly(isobutylene-co-isoprene-co-p-

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methystyrene), poly(isobutylene-co-isoprene-co-styrene), halogenated poly(isobutylene-co-isoprene-co-styrene), poly(isobutylene-co-isoprene-co- α -methystyrene) halogenated poly(isobutylene-co-isoprene-co- α -methystyrene) and mixtures thereof.

16. (Original) The composition according to claim 1 wherein the elastomer comprises units selected from isobutylene, isobutene, 2-methyl-1-butene, 3-methyl-1-butene, 2-methyl-2-butene, 1-butene, 2-butene, methyl vinyl ether, indene, vinyltrimethylsilane, hexene, 4-methyl-1-pentene, isoprene, butadiene, 2,3-dimethyl-1,3-butadiene, myrcene, 6,6-dimethyl-fulvene, hexadiene, cyclopentadiene, piperylene, styrene, chlorostyrene, methoxystyrene, indene and indene derivatives, α -methystyrene, *o*-methystyrene, *m*-methystyrene, and *p*-methystyrene, and *p*-tert-butylstyrene.
17. (Original) The composition according to claim 1 wherein the elastomer is a terpolymer.
18. (Original) The composition according to claim 1 wherein the elastomer is halogenated.
19. (Original) The composition according to claim 1 further comprising a curing agent selected from sulfur, sulfur-based compounds, metal oxides, metal oxide complexes, fatty acids, peroxides, diamines, and mixtures thereof.
20. (Original) The composition according to claim 1 or 19 having a green tack above 0.5 N/mm.
21. (Original) A cured composition according to claim 19 having a brittleness temperature below -36°C.
22. (Original) A cured composition according to claim 19 having an air permeability less than $4.0 \times 10^{-8} \text{ cm}^3 \cdot \text{cm} / \text{cm}^2 \cdot \text{sec} \cdot \text{atm}$.
23. (Original) An article selected from tire curing bladders, innerliners, tire innertubes, and air sleeves comprising a composition according to claim 1 or 19.

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24. (Previously Amended) An article selected from tire curing bladders, innerliners, tire innertubes, and air sleeves, wherein the article comprises (1) a grafted hydrocarbon resin, (2) grafted oligomers having units selected from the group of cyclopentadiene, substituted cyclopentadiene, C₅ monomers, and C₉ monomers, or (3) combinations thereof.
25. (Previously Amended) A process for manufacturing an air barrier comprising mixing (a) an elastomer comprising C₄ to C₇ isoolefin derived units; (b) a processing oil; (c) a grafted material obtainable by the reaction of an unsaturated acid or anhydride and (i) a hydrocarbon resin, (ii) grafted oligomers having units selected from the group of cyclopentadiene, substituted cyclopentadiene, C₄-C₆ conjugated diolefins, and/or C₈-C₁₀ aromatic olefins, and (iii) combinations of (i) and (ii).
26. (Original) The process according to claim 25 further comprising curing the mixed composition.